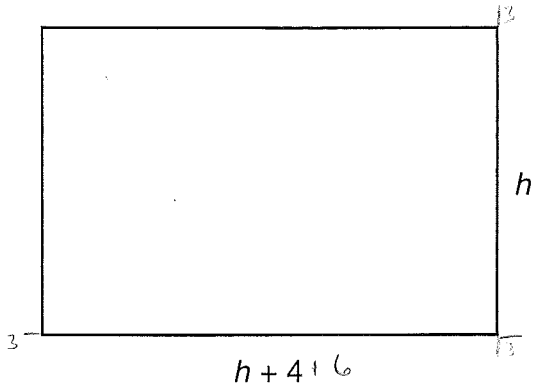
Key

ASSESSMENT ANCHOR
A1.1.1 Operations with Real Numbers and Expressions

Sample Exam Questions

Standard A1.1.1

Keng creates a painting on a rectangular canvas with a width that is four inches longer than the height, as shown in the diagram below.



A. Write a polynomial expression, in simplified form, that represents the area of the canvas.

$h(h+4)$

h^2+4h

Keng adds a 3-inch-wide frame around all sides of his canvas.

B. Write a polynomial expression, in simplified form, that represents the **total area** of the canvas and the frame.

$(h+6)(h+10)$

$h^2+10h+6h+60$

$h^2+16h+60$

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Continued. Please refer to the previous page for task explanation.

Keng is unhappy with his 3-inch-wide frame, so he decides to put a frame with a different width around his canvas. The total area of the canvas and the new frame is given by the polynomial $h^2 + 8h + 12$, where h represents the height of the canvas.

C. Determine the width of the new frame. Show all your work. Explain why you did each step.

$h^2 + 8h + 12$

$(h + 6)(h + 2)$ * factor the polynomial to find the length & height of the picture with the frame.

$(h+6)$ = length

$(h+2)$ = height

$h + 2 - h = (2)$ * The original height is h so I subtracted my new height & the original height & got 2.

The new fram is 2"

Standard A1.1.1

The results of an experiment were listed in several numerical forms as listed below.

5^{-3} $\frac{4}{7}$ $\sqrt{5}$ $\frac{3}{8}$ 0.003

.008 .571 2.23 .375 .003

A. Order the numbers listed from **least** to **greatest.**

0.003 5^{-3} $\frac{3}{8}$ $\frac{4}{7}$ $\sqrt{5}$

Another experiment required evaluating the expression shown below.

$$\frac{1}{6}(\sqrt{36} \div 3^{-2}) + 4^3 \div |-8|$$

B. What is the value of the expression?

$\frac{1}{6}(6 \div \frac{1}{9}) + 64 \div 8$

$\frac{1}{6}(54) + 64 \div 8$

$9 + 8$

value of the expression: 17

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Continued. Please refer to the previous page for task explanation.

The last experiment required simplifying $7\sqrt{425}$. The steps taken are shown below.

$7\sqrt{425}$

step 1: $7(\sqrt{400} + \sqrt{25})$

step 2: $7(20 + 5)$

step 3: $7(25)$

step 4: 175

One of the steps shown is incorrect.

C. Rewrite the incorrect step so that it is correct.

$7(\sqrt{25} \cdot \sqrt{17})$

correction: $7(\sqrt{25}\sqrt{17})$

D. Using the corrected step from **part C**, simplify $7\sqrt{425}$.

$7\sqrt{25}\sqrt{17}$

$7 \cdot 5\sqrt{17}$

$7\sqrt{425} =$ $35\sqrt{17}$

ASSESSMENT ANCHOR
A1.1.2 Linear Equations

Sample Exam Questions

Standard A1.1.2

Nolan has $15.00, and he earns $6.00 an hour babysitting. The equation below can be used to determine how much money in dollars (m) Nolan has after any number of hours of babysitting (h).

$$m = 6h + 15$$

A. After how many hours of babysitting will Nolan have $51.00?

$51 = 6h + 15$
$-15 \quad -15$
$\frac{36}{6} = \frac{6h}{6}$

hours: 6 hours

Claire has $9.00. She makes $8.00 an hour babysitting.

B. Use the system of linear equations below to find the number of hours of babysitting after which Nolan and Claire will have the same amount of money.

$$m = 6h + 15$$

$$m = 8h + 9$$

$6h + 15 = 8h + 9$
$-6h \quad -6h$
$15 = 2h + 9$
$-9 \quad -9$
$\frac{6}{2} = \frac{2h}{2}$

hours: 3 hours

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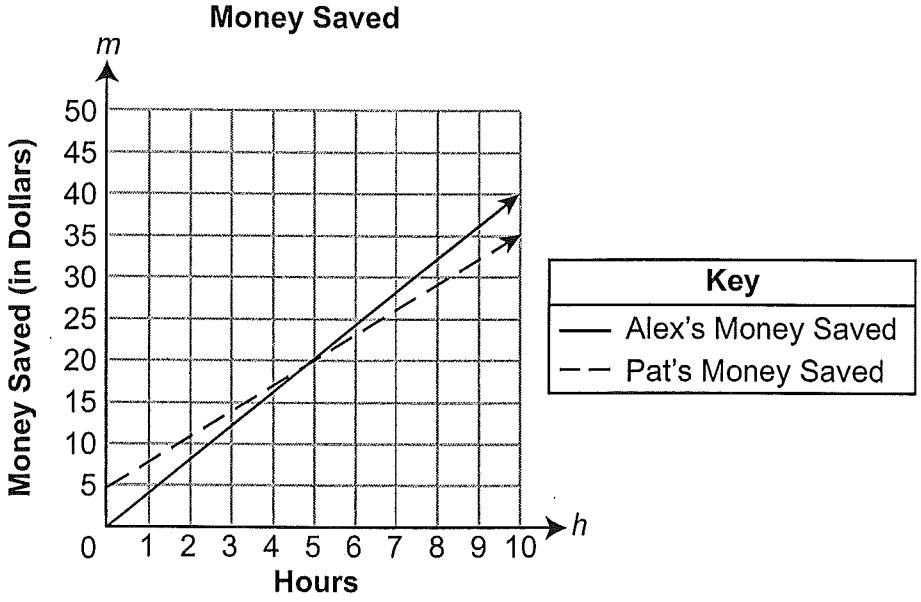
Continued. Please refer to the previous page for task explanation.

The graph below displays the amount of money Alex and Pat will each have saved after their hours of babysitting.



X-axis

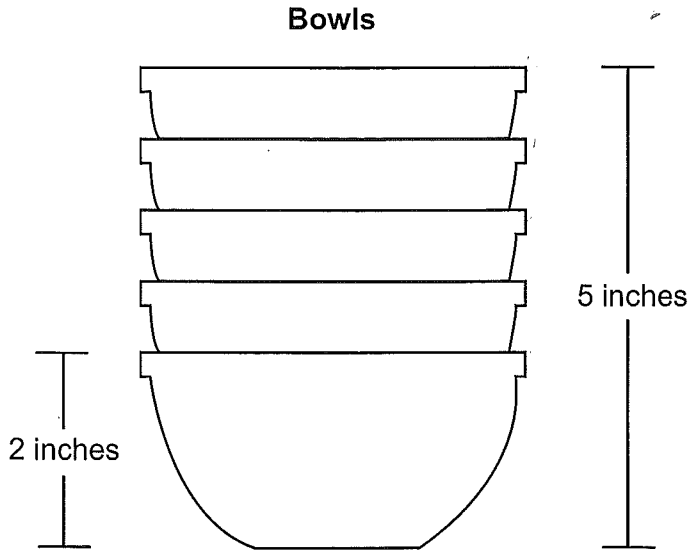
C. Based on the graph, for what domain (h) will Alex have more money saved than Pat? Explain your reasoning.

$H > 5$

At 5 hours they will make the same amount of money. Anything after 5 hours, Alex's line is above Pat's therefore he will make more money.

Standard A1.1.2

The diagram below shows 5 identical bowls stacked one inside the other.



The height of 1 bowl is 2 inches. The height of a stack of 5 bowls is 5 inches.

A. Write an equation using x and y to find the height of a stack of bowls based on any number of bowls.

(1, 2) (5, 5)

$\frac{3}{4}$

equation: $y = \frac{3}{4}x + 1\frac{1}{4}$

$y - 2 = \frac{3}{4}(x - 1)$

$y - 2 = \frac{3}{4}x - \frac{3}{4}$

$+2 \qquad +2$

$y = \frac{3}{4}x + 1\frac{1}{4}$

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Continued. Please refer to the previous page for task explanation.

B. Describe what the *x* and *y* variables represent.

x-variable: # of bowls

y-variable: height of the stack

C. What is the height, in inches, of a stack of 10 bowls?

$y = \frac{3}{4}x + 1\frac{1}{4}$

$\frac{3}{4}(10) + 1\frac{1}{4}$

height: $8\frac{3}{4}$ inches

ASSESSMENT ANCHOR
A1.1.3 Linear Inequalities

Sample Exam Questions

Standard A1.1.3

An apple farm owner is deciding how to use each day's harvest. She can use the harvest to produce apple juice or apple butter. The information she uses to make the decision is listed below.

- A bushel of apples will make 16 quarts of apple juice.
- A bushel of apples will make 20 pints of apple butter.
- The apple farm can produce **no more than** 180 pints of apple butter each day.
- The apple farm harvests **no more than** 15 bushels of apples each day.

The information given can be modeled with a system of inequalities. When x is the number of quarts of apple juice and y is number of pints of apple butter, two of the inequalities that model the situation are $x \geq 0$ and $y \geq 0$.

A. Write 2 more inequalities to complete the system of inequalities modeling the information.

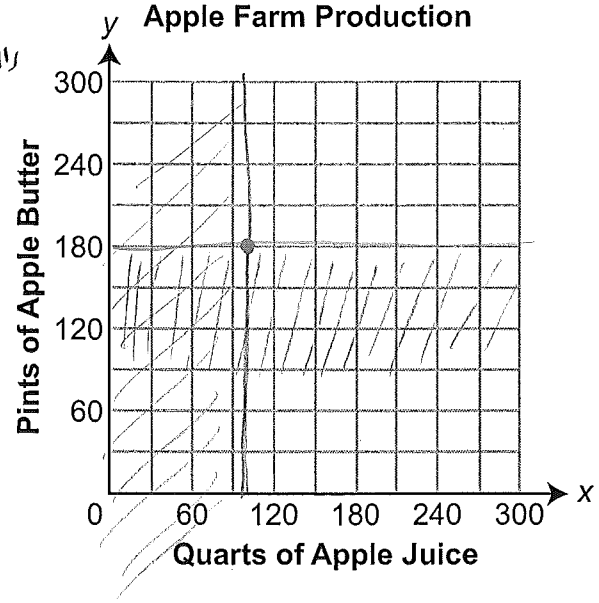
inequalities: $y \leq 180$ $x \leq 96$

B. Graph the solution set of the inequalities from **part A** below. Shade the area that represents the solution set.

butter $\frac{180 \text{ pts}}{20} = 9$ bushels

juice < 6 bushels

$16 \times 6 =$



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Continued. Please refer to the previous page for task explanation.

The apple farm makes a profit of $2.25 on each pint of apple butter and $2.50 on each quart of apple juice. J y

C. Explain how you can be certain the maximum profit will be realized when the apple farm produces 96 quarts of apple juice and 180 pints of apple butter.

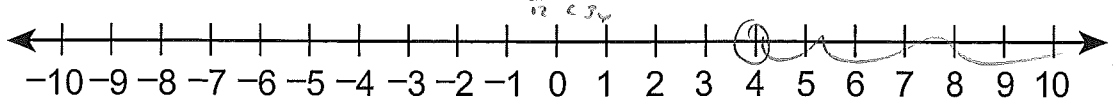
It is the point of intersection

Standard A1.1.3

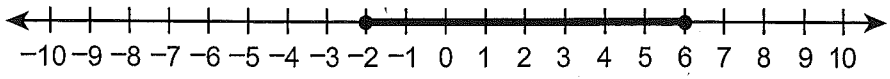
David is solving problems with inequalities.

One of David's problems is to graph the solution set of an inequality.

A. Graph the solution set to the inequality $4x + 3 < 7x - 9$ on the number line below.



David correctly graphed an inequality as shown below.



The inequality David graphed was written in the form $7 \leq$? ≤ 9.

B. What is an expression that could be put in place of the question mark so that the inequality would have the same solution set as shown in the graph?

$7 \leq$ _____ ≤ 9

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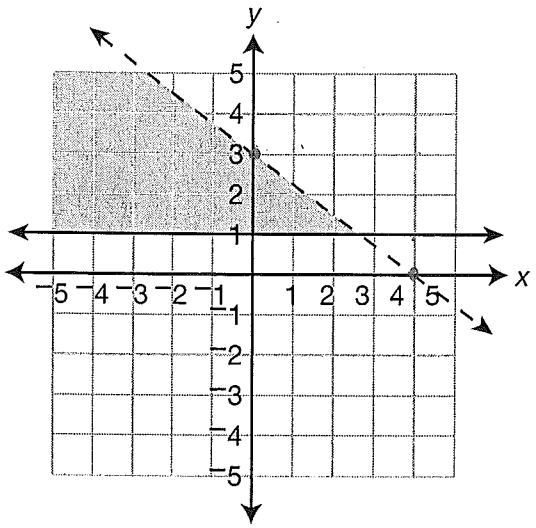
Continued. Please refer to the previous page for task explanation.

The solution set to a system of linear inequalities is graphed below.



C. Write a system of 2 linear inequalities which would have the solution set shown in the graph.

$y \geq 1$ $\quad y < -\frac{3}{4}x + 3$

linear inequality 1: $y \geq 1$

linear inequality 2: $y < -3/4x + 3$

ASSESSMENT ANCHOR
A1.2.1 Functions

Sample Exam Questions

Standard A1.2.1

Hector's family is on a car trip.

When they are 84 miles from home, Hector begins recording their distance driven (d), in miles, after h hours in the table below.

Distance by Hour

Time in Hours (h)	Distance in Miles (d)
0	84
1	146
2	208
3	270

The pattern continues.

A. Write an equation to find the distance driven (d), in miles, after a given number of hours (h).

$d = 62h + 84$

Continued next page

Continued. Please refer to the previous page for task explanation.

B. Hector also kept track of the remaining gasoline. The equation shown below can be used to find the gallons of gasoline remaining (g) after distance driven (d), in miles.

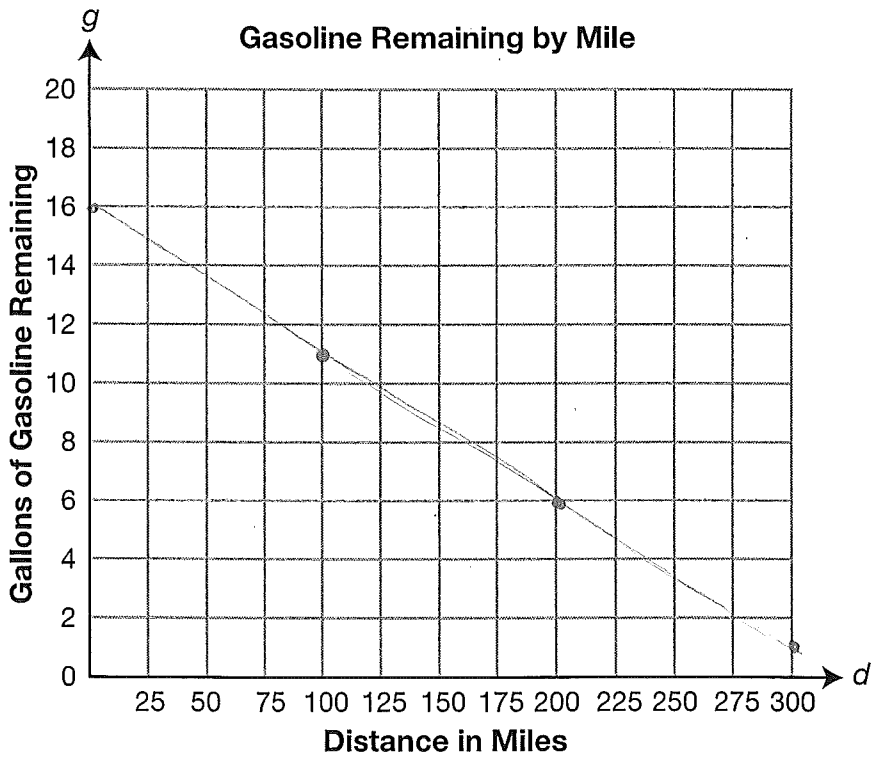
$$g = 16 - \frac{1}{20}d$$

Use the equation to find the missing values for gallons of gasoline remaining.

Gasoline Remaining by Mile

Distance in Miles (d)	Gallons of Gasoline Remaining (g)
100	11
200	6
300	1

C. Draw the graph of the line formed by the points in the table from **part B.**



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Continued. Please refer to the previous page for task explanation.

D. Explain why the slope of the line drawn in **part C** must be negative.

The line is decreasing from left to right.
You are using gas so there is less in the tank

MODULE 2—Linear Functions and Data Organizations

Standard A1.2.1

Last summer Ben purchased materials to build model airplanes and then sold the finished models. He sold each model for the same amount of money. The table below shows the relationship between the number of model airplanes sold and the running total of Ben's profit.

Ben's Model Airplane Sales

Model Airplanes Sold	Total Profit
12	$68
15	$140
20	$260
22	$308

A. Write a linear equation, in slope-intercept form, to represent the amount of Ben's total profit (y) based on the number of model airplanes (x) he sold.

$y - 68 = 24(x - 12)$

$y - 68 = 24x - 288$

$m = \frac{140 - 68}{15 - 12} = \frac{72}{3} = 24$

$y = y = 24x - 220$

B. How much did Ben spend on his model-building materials?

$ 220

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MODULE 2—Linear Functions and Data Organizations

Continued. Please refer to the previous page for task explanation.

C. What is the fewest number of model airplanes Ben needed to sell in order to make a profit?

$0 = 24x - 220$

9.1

fewest number: 10 model airplanes

D. What is a reasonable value in the range that would be a negative number?

D - x
R - y

range value: -220

ASSESSMENT ANCHOR
A1.2.2 Coordinate Geometry

Sample Exam Questions

Standard A1.2.2

Georgia is purchasing treats for her classmates. Georgia can spend exactly $10.00 to purchase 25 fruit bars, each equal in price. Georgia can also spend exactly $10.00 to purchase 40 granola bars, each equal in price.

A. Write an equation which can be used to find all combinations of fruit bars (x) and granola bars (y) that will cost exactly $10.00.

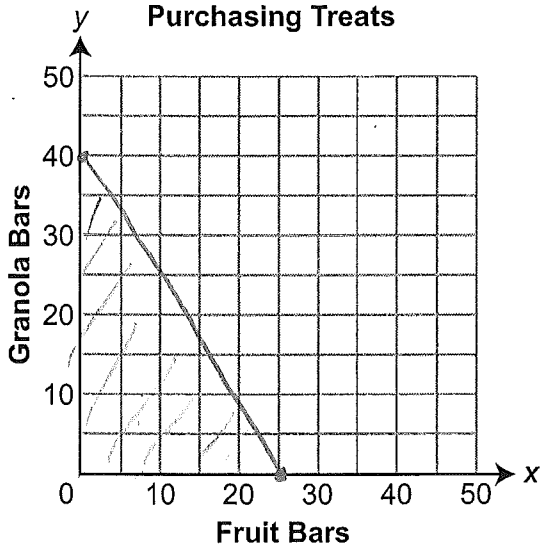
$\frac{\$10}{25}$ .40ea $\frac{\$10}{40}$ .25ea

.40x + .25y ≤ 10

equation: .40f + .25g ≤ 10

B. Graph the equation from **part A** below.

(0, 40)
(25, 0)



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Continued. Please refer to the previous page for task explanation.

C. What is the slope of the line graphed in **part B**?

$.40x + .25y \leq 10$

$.25y \leq -.40x + 10$

$y \leq 1.6x + 40$

$1\frac{3}{5}$

slope: 8/5

D. Explain what the slope from **part C** means in the context of Georgia purchasing treats.

8 granola for every 5 fruit

She can purchase granola bars to fruit bars in a ratio of 8 to 5 & spend exactly 40.

MODULE 2—Linear Functions and Data Organizations

Standard A1.2.2

Ahava is traveling on a train.

The train is going at a constant speed of 80 miles per hour.

A. How many hours will it take for the train to travel 1,120 miles?

$$\frac{1120}{80}$$

hours: 14 hours

Ahava also considered taking an airplane. The airplane can travel the same 1,120 miles in 12 hours less time than the train.

B. What is the speed of the airplane in miles per hour (mph)?

$$\frac{1120}{2}$$

speed of the airplaine: 560 mph mph

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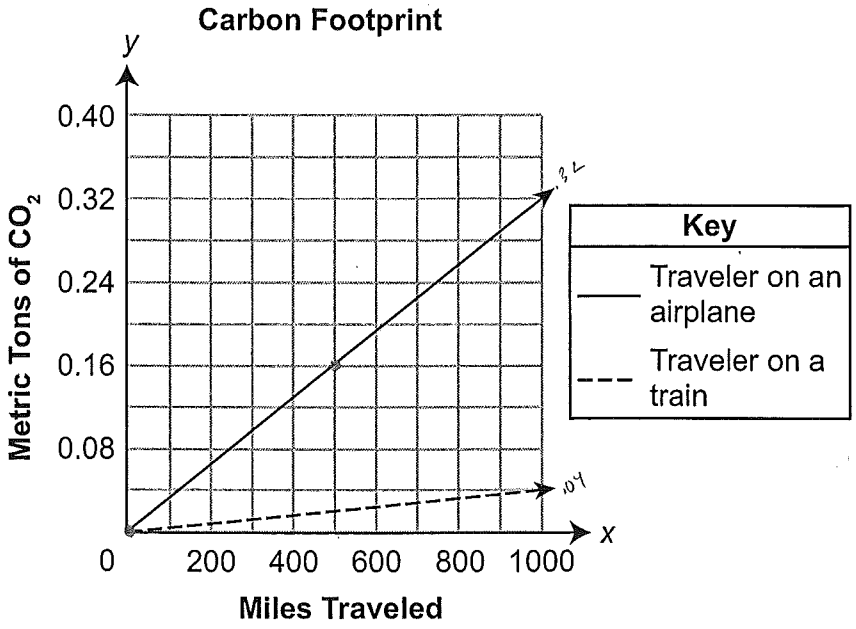
Continued. Please refer to the previous page for task explanation.

Ahava is very concerned about the environment. The graph below displays the carbon dioxide (CO_2), in metric tons, for each traveler on an airplane and each traveler on a train.



C. What is the equation to find the metric tons of CO_2 produced (y) by a traveler on an airplane for miles traveled (x)?

(0,0) (500, .16) $m = \frac{.16 - 0}{500 - 0} = .00032$

equation: $y = .00032x$

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Continued. Please refer to the previous page for task explanation.

On another trip, Ahava traveled to her destination on a train and returned home on an airplane. Her total carbon footprint for the trip was 0.42 metric tons of CO_2 produced.

D. How far, in miles, is Ahava's destination from her home?

$y = .00004x$

$y = .00032x$

miles: 1166.7 miles

.046
.373

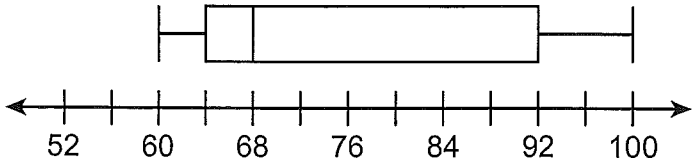
ASSESSMENT ANCHOR
A1.2.3 Data Analysis

Sample Exam Questions

Standard A1.2.3

The box-and-whisker plot shown below represents students' test scores on Mr. Ali's history test.

History Test Scores



A. What is the range of scores for the history test?

range: 60 - 100

B. What is the **best** estimate for the percent of students scoring greater than 92 on the test?

percent: 25% %

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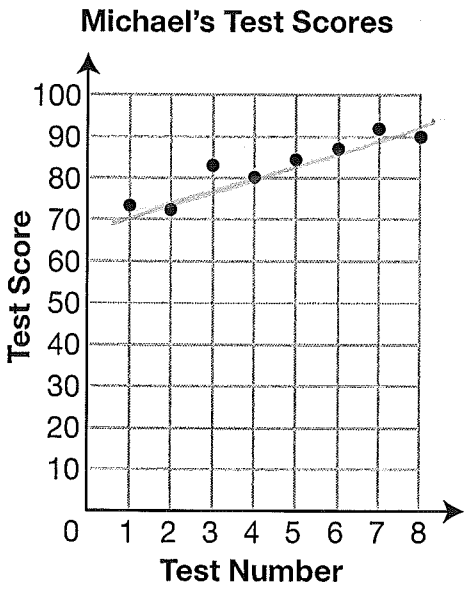
Continued. Please refer to the previous page for task explanation.

Mr. Ali wanted more than half of the students to score 75 or greater on the test.

C. Explain how you know that more than half of the students did **not** score greater than 75.

The median is 68% and 50% of your data is above the median. Therefore, we can't be sure what % of the students scored above a 75% but it's less than 50%

Michael is a student in Mr. Ali's class. The scatter plot below shows Michael's test scores for each test given by Mr. Ali.



D. Draw a line of best fit on the scatter plot above.

MODULE 2—Linear Functions and Data Organizations

Standard A1.2.3

The weight, in pounds, of each wrestler on the high school wrestling team at the beginning of the season is listed below.

178 142 112 150 206 130

A. What is the median weight of the wrestlers?

112 130 142 150 178 206

150
+142
292

146
2 | 292
-2
09
-8
12

median: 146 pounds

B. What is the mean weight of the wrestlers?

mean: 153 pounds

Continued next page

Continued. Please refer to the previous page for task explanation.

Two more wrestlers join the team during the season. The addition of these wrestlers has no effect on the mean weight of the wrestlers, but the median weight of the wrestlers increases 3 pounds.

C. Determine the weights of the two new wrestlers.

mean = 153

med = +3 = 144

new wrestlers: 148 pounds and 158 pounds